

REMARKS

Reconsideration and allowance of this application are respectfully requested in view of the above Amendment and the discussion below.

Claims 18-21 have been rejected as unpatentable over previously cited references to Kwakatsu (U.S. Patent No.: 4,335,429), Tadahiro et al. (JP 8-33246) and the newly cited and newly applied reference to Brown (U.S. Patent No.: 9,989,146) as indicated at item 3 on pages 2 and 3 of the patent Office Action.

The present invention, as defined by independent claims 18 and 20, is able to achieve a torque in the reverse direction which is higher than a torque in the forward direction similar to that of a conventional transmission having a forward and backward changing gear. However, the present invention achieves this relationship in a hybrid electric vehicle having a transmission with no forward and backward changing gear. This relation in the present invention is achieved by the permanent magnet type dynamo-electric machine, as claimed, wherein the essential feature is that the permanent magnet insertion hole is inclined at a predetermined angle in the circumferential direction so that the circumferential shape at each pole of the rotor is asymmetrical. Additionally, the distance between the rotational gap in the forward rotational side is greater than the distance from the rotational gap in the backward or the reverse rotation side and the magnetic flux density of the permanent magnet in the forward rotation side

becomes lower than the magnetic flux density of the permanent magnet in the reverse rotation side.

Therefore, with the presently claimed invention, the ratio between the maximum torque and the forward rotation output by the permanent magnet dynamo-electric machine at a time when the hybrid electric vehicle moves forward and the maximum torque in the reverse rotation output by the permanent magnet at a time when the hybrid electric moves backward is a ratio of 1:1.05-1.2 so that the maximum torque in the backward rotation of the permanent magnet dynamo-electric machine becomes larger.

The reference to Tadahiro '246, in contrast to the presently claimed invention, discloses a rotor in which a permanent magnet is inserted in a permanent magnet insertion hole which is inclined downward in a rotational direction of a motor (forward rotation direction). This permanent magnet insertion disclosed in Tadahiro is inclined in this downward direction in order to intensify the magnetic flux of the permanent magnet in the forward rotation direction. Additionally, the leakage flux preventing hole is provided between the permanent magnets adjacent in the circumferential direction in order to prevent leakage flux from the permanent magnets.

As a result, in Tadahiro, the magnetic flux density of the permanent magnet in the rotational direction (forward direction) becomes higher than the magnetic flux density of the permanent magnet in the backward rotation so that the magnetic flux density of the permanent magnet in the forward rotation side does not become lower than the magnetic flux density of the permanent in the backward or reverse rotation side which is not only different, but exactly the opposite from the presently claimed invention. Therefore, Tadahiro has a maximum torque in the forward rotation direction which becomes greater than

the maximum torque in the backward direction which is absolutely an opposite result than the presently claimed invention.

The present invention reduces the magnetic flux (effective magnetic flux) of the permanent magnet running into the stator side and the forward rotational direction in order to lower the magnetic flux density of the permanent magnetic, which is an entirely different concept from Tadahiro in which the leakage flux preventing hole is provided for preventing leakage flux from the permanent magnet.

The reference to Kawakatsu '429 discloses a parallel type hybrid electric vehicle with no discussion or disclosure of the permanent magnet type dynamo-electric machine claimed in the present invention. Additionally, the '429 reference discloses a conventional transmission having both the forward and backward changing gear.

In the "Response to Comments" section at page 5 of the rejection, the Examiner has indicated that the arguments concerning the "conventional transmissions having both the forward and backward changing gear" were mere arguments not supported by a quotation from the specification of the '429 reference. Applicant's submit that the specification at column 5 line 66 through column 6 line 3 indicate that the output of he motor/generator 7 is coupled through a transmission means such as a differential gear to the wheel shaft and thus the wheels to establish a power train of the engine/electric hybrid vehicle. One skilled in the art cannot assume that this means anything other than a conventional transmission with forward and backward changing gears and thus Applicants renews their submission that even if the references are combined the present invention would not result as the only teaching of "429 with regard to the present invention is that of a hybrid vehicle. One skilled in the art would not

ignore the object purpose and result of the references as he does not have the benefit of applicants disclosure to rely on.

The reference to Brown '146 discloses a transmission for a four-wheel drive with a relationship whereby the torque for the backward drive is greater than the torque for the forward drive, but has no disclosure of a permanent magnet type dynamo-electric machine as described and claimed in each of independent claims 18 and 20. Claims 18 and 20 specify a hybrid electric vehicle having a permanent magnet type dynamo-electric machine connected to a transmission wherein the rotor of the machine has a permanent magnet inserted in a hole in order to be arranged in a circumferential direction so that the north and south poles are alternately arranged and this magnetic insertion hole is inclined at a predetermined angle of incline to provide an asymmetrical shape of the rotor with the ratio of the maximum torque in the forward direction and the maximum torque in the backward direction having a relationship of 1:1.05-1.2 so that the maximum torque in the backward rotation direction becomes greater and so that a distance from the gap in the forward rotation side becomes greater than the distance from the rotation gap in the backward rotation side to provide flux density in the forward rotation lower than flux density in the backward rotation.

Applicants respectfully submit that independent claims 18 and 20 clearly provide structure not shown or disclosed or made obvious by the references or their combination even if, for purposes or arguments, the references could be combined.

Claims 18 and 20 have alternatively been rejected over Tadahiro in view of Brown as indicated at Item 4 on pages 3 and 4 of the Office Action. Applicants again submit that the disclosures of Tadahiro and Brown discussed above fail to

provide the present invention as neither concerns a hybrid vehicle and the preamble may not be ignored especially in an obviousness rejection. How is one skilled in the art to combine references if neither reference is concerned with the subject matter of the claims? As indicated above, the present invention would not result, even if, for purposes of argument, the references were combined.

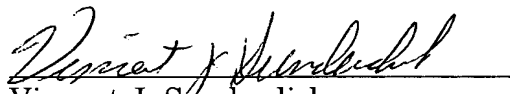
Accordingly, Applicants respectfully request that this application containing claims 18-21 be allowed and passed to issue.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #056203.49196DV).

Respectfully submitted,

September 9, 2005 .



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